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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/562,014

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EXAMINER

THROWER, LARRY W

ART UNIT

PAPER NUMBER

1742

NOTIFICATION DATE

DELIVERY MODE

12/22/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/562,014	Applicant(s) MASSIMO, TORMEN	
	Examiner LARRY THROWER	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 December 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22,24,25,27-31,33,34 and 37-40 is/are pending in the application.
- 4a) Of the above claim(s) 37 and 38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22,24,25,27-31,33,34,39 and 40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment filed December 13, 2010 has been entered. Claim 1 is amended; claims 23, 26, 32 and 35-36 are canceled; claims 37-38 are withdrawn. Claims 1-22, 24-25, 27-31, 33-34 and 39-40 are under examination.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
3. **Claims 1-22, 24-25, 27-30, 33-34 and 39-40** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chou (US 5,772,905) in view of Kim (US 5,064,597).
 - Regarding **claim 1**, Chou discloses a nano-impression lithographic process for forming a pattern in relief on a mass of polymeric material for use in micro-devices and nano-devices (abstract). The process includes preparing the mass of polymeric material having a three-dimensional form and a die having a surface region facing towards the mass of polymeric material and which reproduces in negative the pattern in relief (col. 4, lines 26-38), heating the die and putting the mass of polymeric material into contact with the die such that the polymeric material in contact with the surface are subject to softening (col. 4, line 64 - col. 5, line 14), separating the die from the mass of polymeric material on the surface of the pattern

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in relief (col. 5, lines 1-14) and wherein the region of the die in which thermal energy is generated is in the form of a layer (figs. 1a-d).

- Chou is silent as to how the die is heated. However, Kim discloses a process for forming a pattern in relief on a mass of polymeric material (abstract), which includes heating only the surface region of the die by generation of thermal energy upon dissipation of another form of energy in at least one region of the die wherein the surface region of the die in which thermal energy is generated is in the form of a surface layer of the die (col. 4, lines 21-28). As taught by Kim, generation of thermal energy upon dissipation of another form of energy in at least one region of the die effectively heats the die (col. 4, lines 14-35). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have heated the die of Chou by generating thermal energy upon dissipation of another form of energy in at least one region of the die to effectively heat the die, as taught by Kim.
- Chou discloses that the region of the die in which thermal energy is generated is greater than the glass transition temperature of the polymeric material (col. 4, line 65 - col. 5, line 1), but is silent as to the amount of time it remains at this temperature. However, absent evidence of unexpected results obtained from heating for the claimed time period, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected a suitable time period to effectively soften the polymer and fill the mold surface completely, resulting in a smooth surface finish as taught by Kim (col. 4, lines 5-35), the time period being a result effective variable routinely optimized by those of skill in the art. The

optimization of a range or other variable within the claims that flows from the “normal desire of scientists or artisans to improve upon what is already generally known” is prima facie obvious. In re Peterson, 315 F.3d 1325, 1330 (Fed. Cir. 2003) (determining where in a disclosed set of percentage ranges the optimum combination of percentages lies is prima facie obvious). The discovery of an optimum value of a variable in a known process is usually obvious. In re Aller, 220 F.2d 454, 456 (C.C.P.A. 1955).

- Regarding **claim 2**, Chou discloses the mass of polymeric material having a three-dimensional form (col. 4, lines 13-38; figs. 1A-1D).
- Regarding **claim 3**, Chou discloses the heated die being at a smaller distance than 100 microns from the surface carrying the pattern in relief of the die (col.4, lines 39-49).
- Regarding **claim 4**, Chou discloses the mass of polymeric material being in the form of a deposited film (col. 4, lines 10-12).
- Regarding **claims 5 and 7**, Chou discloses that the region of the die in which thermal energy is generated is greater than the glass transition temperature of the polymeric material (col. 4, line 65 - col. 5, line 1), but is silent as to the amount of time it remains at this temperature. However, absent evidence of unexpected results obtained from heating for the claimed time period, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected a suitable time period to effectively soften the polymer and fill the mold surface completely, resulting in a smooth surface finish as taught by Kim (col. 4,

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lines 5-35), the time period being a result effective variable routinely optimized by those of skill in the art. The optimization of a range or other variable within the claims that flows from the “normal desire of scientists or artisans to improve upon what is already generally known” is prima facie obvious. In re Peterson, 315 F.3d 1325, 1330 (Fed. Cir. 2003) (determining where in a disclosed set of percentage ranges the optimum combination of percentages lies is prima facie obvious). The discovery of an optimum value of a variable in a known process is usually obvious. In re Aller, 220 F.2d 454, 456 (C.C.P.A. 1955).

- Regarding **claim 6**, Chou discloses the process including a plurality of successive cycles of heating, contracting and separation (col. 5, lines 43-64; claim 7).
- Regarding **claim 8**, Chou discloses the heating and contacting being synchronized (col. 5, lines 1-14).
- Regarding **claim 9**, Chou discloses the die being put into contact under pressure with the polymer (col. 5, lines 1-14).
- Regarding **claim 10**, Chou discloses the pressure being pulsed
- Regarding **claim 11**, Chou discloses the pressure being mechanical (col. 5, lines 1-14).
- Regarding **claim 12**, Kim discloses the die being preheated to a desired temperature (col. 4, lines 21-35).
- Regarding **claim 13**, the quantity of thermal energy generated inherently varies in the process of Kim.

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- Regarding **claim 14-15**, Chou discloses the polymer being polymethylmethacrylates.
- Regarding **claim 16**, Chou discloses at least one portion of the surface of the die being clad with a release agent (col. 4, lines 57-63).
- Regarding **claim 17**, Chou discloses after the pattern in relief has been formed on the surface of the mass of polymeric material, a treatment is performed with an attach agent so as to remove the polymeric material where it has been compressed (col. 5, lines 10-14).
- Regarding **claim 18**, Chou discloses that the surface region of the die which reproduces the pattern in relief in negative is aligned with pre-existing reference signs on the mass of polymeric material (col. 6, lines 42-67).
- Regarding **claims 19, 27 and 39**, Kim discloses the region of the die in which thermal energy is generated is of electrically conductive metal material (col. 4, lines 14-60).
- Regarding **claims 20**, Kim discloses the energy dissipated in heat being provided by an electric current which flows in an electrically conductive material (col. 4, lines 14-60).
- Regarding **claim 21**, Kim discloses the direction of flow of the electric current being substantially perpendicular to the direction of relative movement of the mass of polymeric material and the die (col. 4, lines 14-60; figs. 9-12).

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- Regarding **claim 22**, Chou discloses the region of the die in which thermal energy is generated coinciding with the surface region which reproduces the pattern in relief in negative (col. 4, line 57 - col. 5, line 14; figs. 1a-d).
- Regarding **claims 24-25**, Chou discloses the region of the die in which thermal energy is generated is in the form of a layer having a thickness less than 2 microns which is nonuniform (col. 4, line 39 - col. 5, line 14; figs. 1a-d).
- Regarding **claim 28**, Chou discloses the electrically conductive material being a semiconductor (col. 4, lines 39-49).
- Regarding **claims 29-30**, Chou discloses that the layer of electrically conductive material is obtained by doping a surface layer of an intrinsically semiconductive substrate, and silicon on insulator (col. 4, lines 39-49).
- Regarding **claims 33-34**, Kim is silent as to how the electric current is generated. However, applying a potential difference or magnetic field were well known techniques for generating an electric current at the time the invention was made. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected a well known electric current generation technique in the lithographic process of modified Chou.
- Regarding **claim 40**, Chou discloses the semiconductor to be silicon (col. 4, lines 39-49).

4. **Claim 31** is rejected under 35 U.S.C. 103(a) as being unpatentable over Chou (US 5,772,905) in view of Kim (US 5,064,597), as applied to claim 1 above, further in view of Zapka *et al.* (US 4,855,197).
- Chou is silent as to how the silicon is doped. However, Zapka *et al.* discloses a lithographic process which includes doping by ion implantation (abstract). As taught by Zapka *et al.*, doping by ion implantation permits distortion-free transfer of a desired pattern (col. 2, lines 43-50). Thus, it would have been obvious to one of ordinary skill in the art to have modified the lithographic process of Chou by doping by ion implantation because as taught by Zapka *et al.*, such doping creates a mold which permits distortion-free transfer of a desired pattern.

Response to Arguments

5. Applicant's arguments filed January 11, 2010 have been fully considered but they are not persuasive.
- Applicant first argues that because claim 1 now requires the polymeric material have a two-dimensional or three-dimensional form, "it should be irrefutable that the starting material of the present process is a solid." This argument has been considered but is not persuasive. A softened film, indeed even a liquid, also has a three-dimensional form.
 - Applicant further argues that because the PMMA of Chou is heated prior to contacting the mold, "the softening thereof is certainly not brought about by the successive contact with the mold." This argument has been considered but is not

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persuasive because it is not commensurate in scope with the claims. The claims do not require the softening of the PMMA to be brought about by the successive contact with the mold. Claim 1 explicitly recites that contact and softening occur "in any temporal sequence."

- Applicant further argues that the "process of Kim is even more different . . . because it presupposes that the plastics material is even **molten** prior to contacting the mold, whereas the plastics material of the present invention is initially solid (having a defined form or shape) and is successively at most softened, without being molten." (emphasis in Applicant's response). This argument has been considered but is not persuasive because it is also not commensurate in scope with the claims. As discussed above, having a three-dimensional form does not preclude the polymeric material from being molten, nor require that the material is initially solid. Moreover, the claims do not require the material to be "successively at most softened, without being molten."
- Applicant further argues that Kim is directed to molding macro-articles and the instant claims are directed to micro- and nano-devices. This argument has been considered but is not persuasive. A person of ordinary skill is presumed to have the ability to select and utilize knowledge from other arts that are reasonably pertinent. *In re Antle*, 444 F.2d 1168, 1171-72, 58 CCPA 1382, 170 USPQ 285, 287-88 (CCPA 1971). Kim teaches that heating of the mold surface layer provides more flow of the resin at the same pressure, which one of ordinary skill in the art would readily recognize as being applicable to a wide variety of molding processes.

- Applicant finally argues that the present invention is distinguished from the prior art because "it is sufficient that such surface layer of the mold is at a temperature $>T_g$ in order to heat immediately the polymeric material at a corresponding temperature, avoiding the need of any pre-heating thereof." (emphasis added). This argument has been considered but is not persuasive because it is also not commensurate in scope with the claims. The instant claims do not require any "immediate" heating, nor do they preclude preheating the polymeric material. Note the "comprising" language, which leaves the process open for additional steps.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LARRY THROWER whose telephone number is 571-270-5517. The examiner can normally be reached on Monday through Friday from 9:30AM-6PM est.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina A. Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Larry Thrower/
Examiner, Art Unit 1742

/Christina Johnson/

Supervisory Patent Examiner, Art Unit 1742